Institute of Remote Sensing and Digital Earth
Chinese Academy of Sciences

CropWatch

CropWatch for food security

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Institute of Remote Sensing and Digital Earth (RADI)
Chinese Academy of Sciences (CAS)

CropWatch® Development

- **Kick off in 1998**
- **Supported by CAS,NDRC ,MOST,…, more than 15 projects with 70 millions input**
- **Release first bulletin in August, 1998**
- **Improvement and development (15 Years)**
  - **From manual judgment to quantitative monitoring**
  - **From instant investigation to dynamic monitoring**
  - **From after harvest measurement to early prediction. The crop production data can be available one month before its harvest.**
- **English bulletin, November 2013**

4 scales

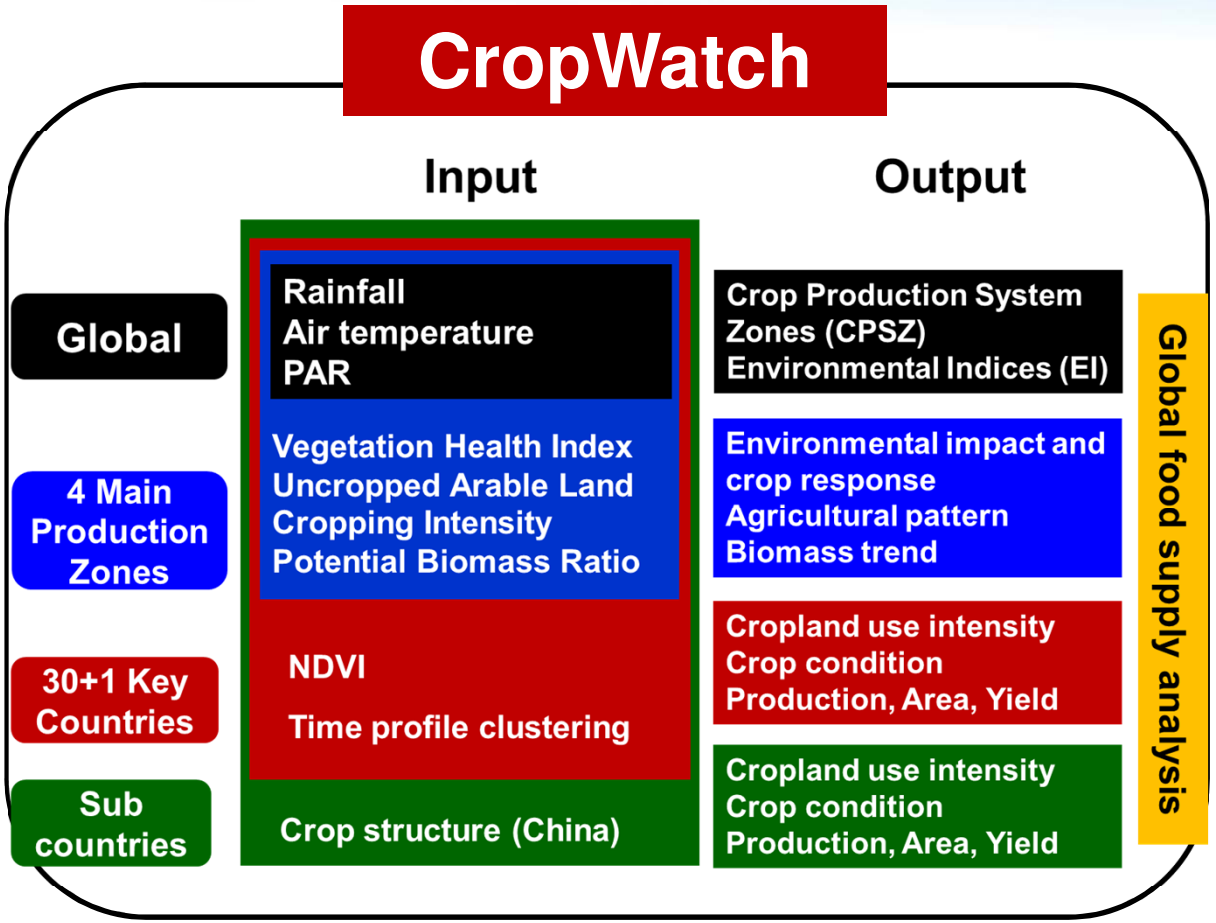
- 60CPSZ
- 4 MPZ
- 31 main crop countries 80% global production
- Sub-national

3 temporal resolution

- 15 Days: NDVI, Crop condition
- Growing season： Area, Yield, Production
- Year： EI, CI, UAL, PBR

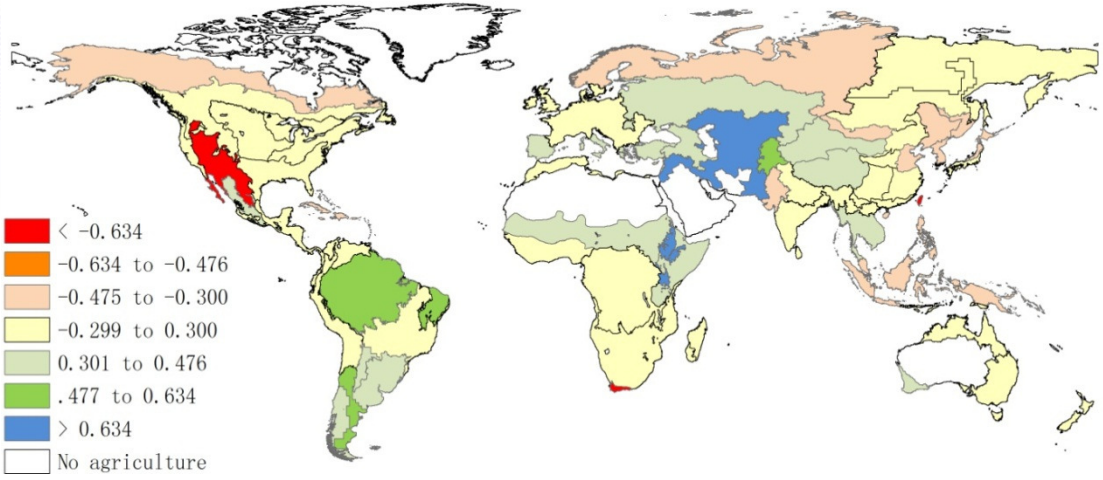
3 spatial resolution

- 0.25° (Global)
- 1km (4 MPZ, countries)
- 30m

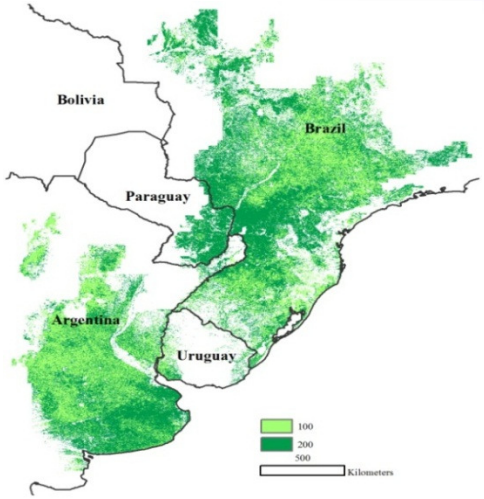


Methodology

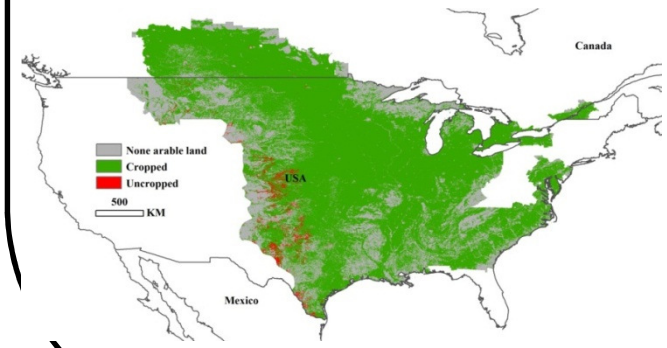
Environmental indices (EI)



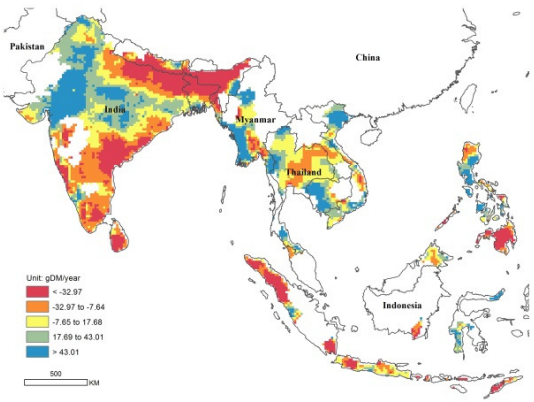
Cropping intensity (CI)



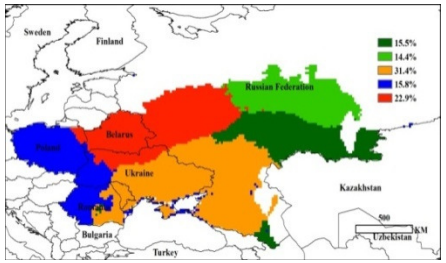
Uncropped Arable Land ratio (UAL)

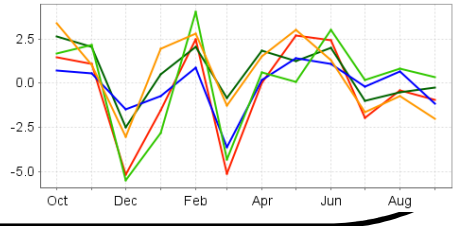


Potential Biomass Ratio (RBR)



Time profile clustering

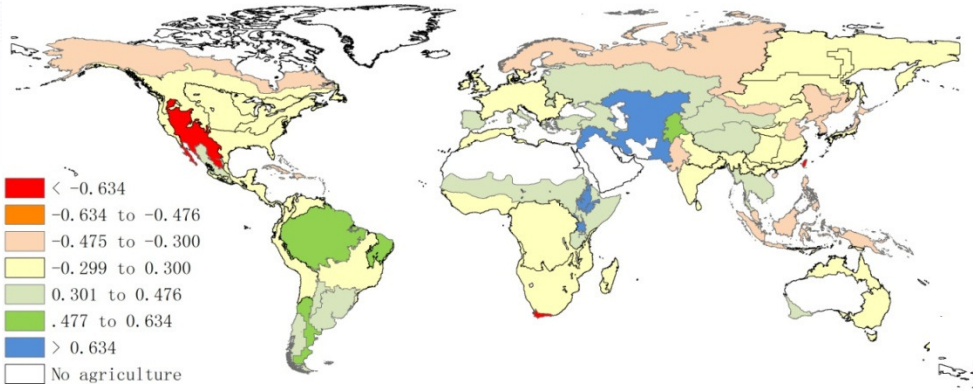




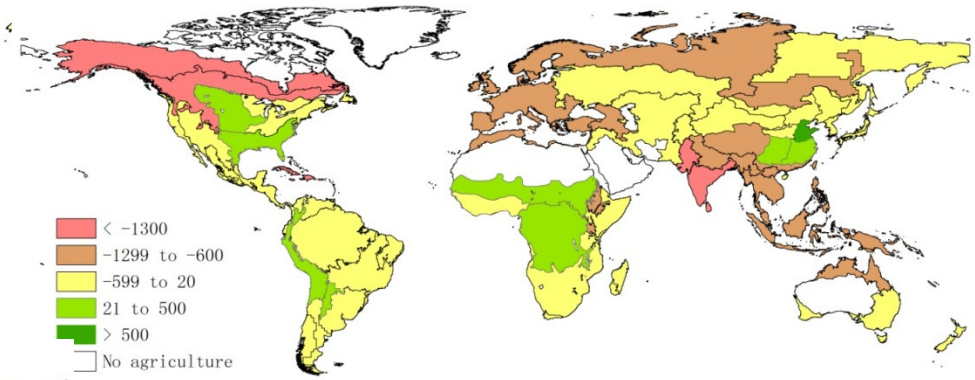
Environmental Impact

CropWatch Online | Bulletin Download (English 中文)

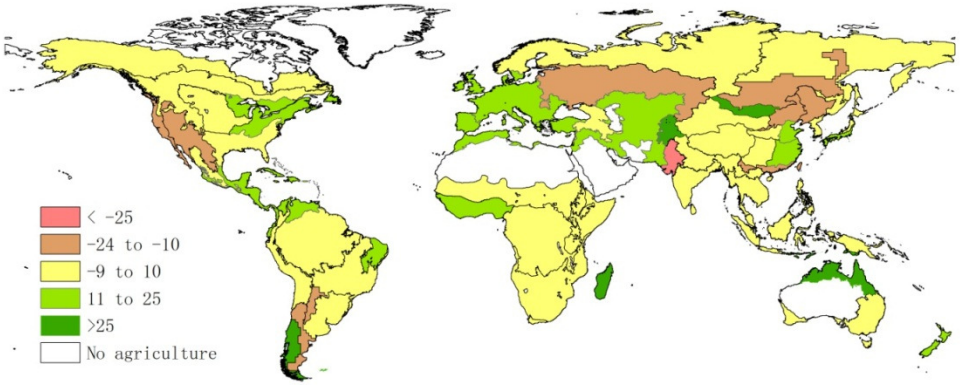
Home | Summary | Environmental Indices | Major Production Zones | Key Countries | China | Focus



Global **temperature** trends

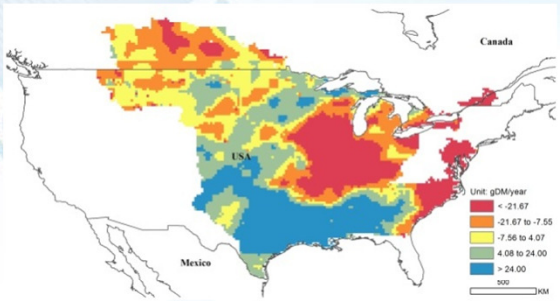


Accumulated PAR (W/m^2) for October 2012-September 2013, compared with five-year average

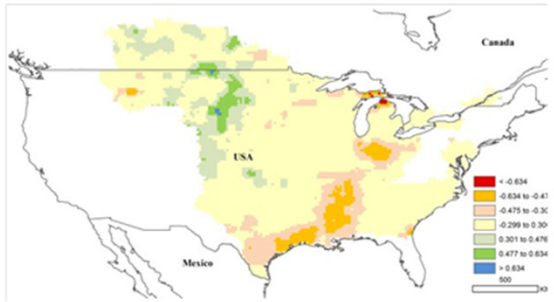


Accumulated rainfall index anomaly, April to September 2013 (percent)

Potential Biomass



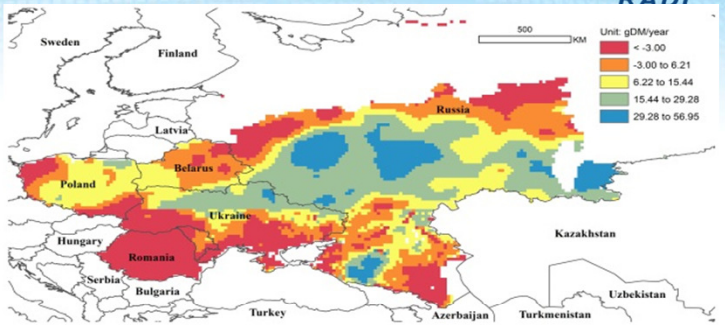
c. Biomass 2013 departure from five-year average



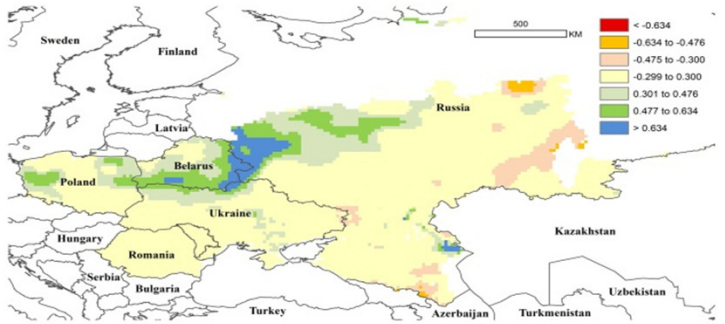
d. Biomass trend

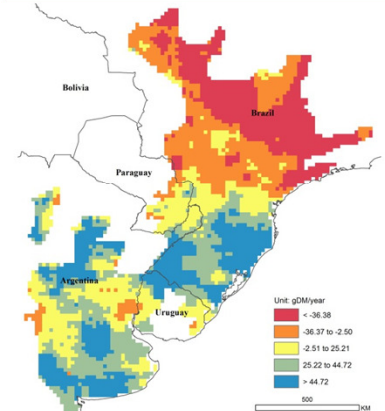
Potential Biomass Ratio

Biomass Trend

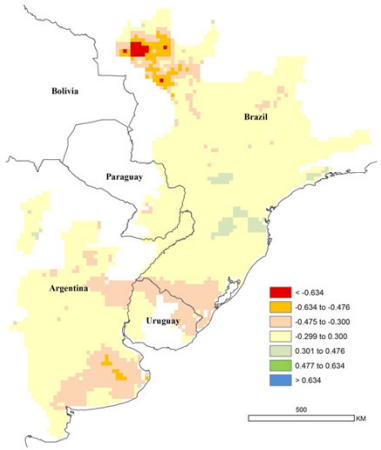


c. 2013 biomass departure from five-year average

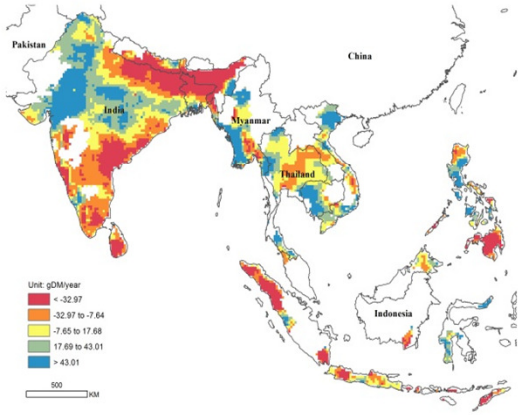




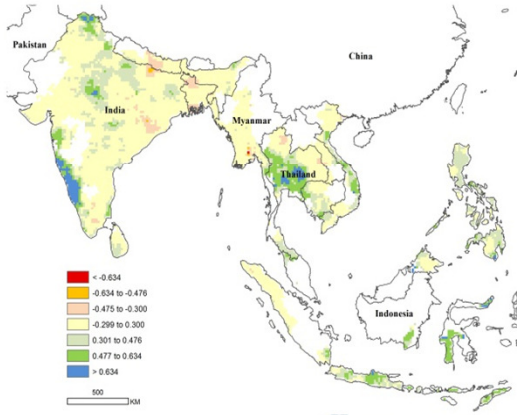
c. 2013 biomass departure from five-year average



d. Biomass trend

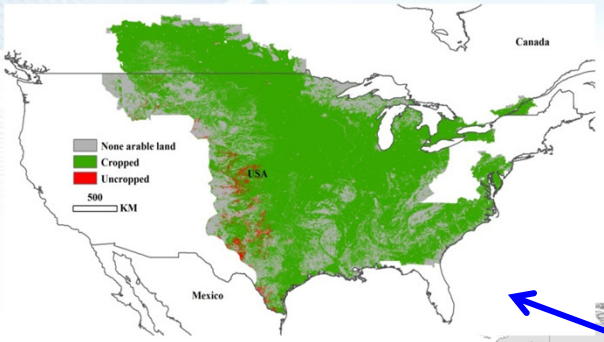


c. 2013 biomass departure from five-year average



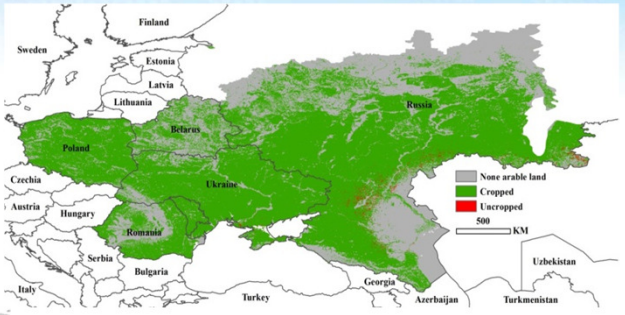
d. Biomass trend

Cropping activities

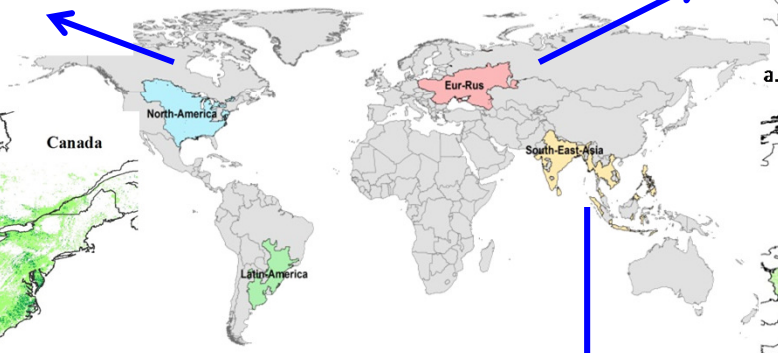


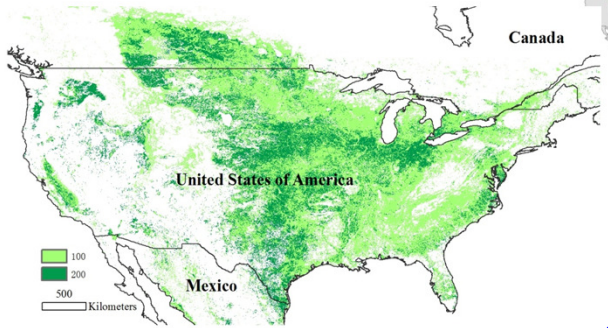
a. Cropped and uncropped arable land

Uncropped Arable Land



a. Cropped and uncropped arable land

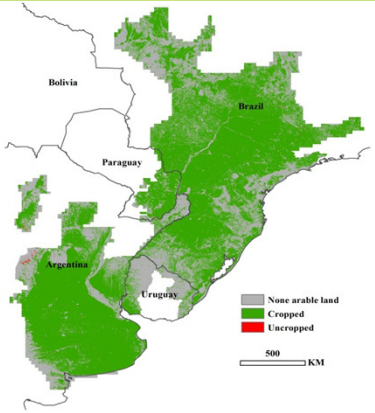


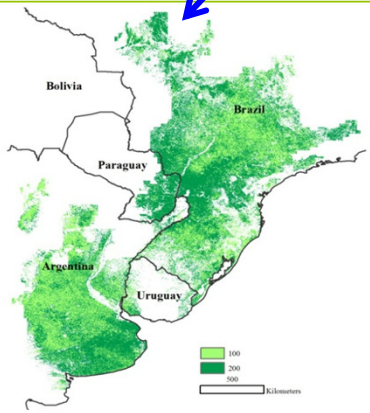


b. Cropping index

Crop Intensity

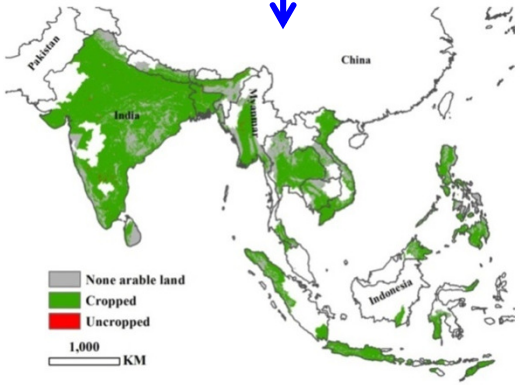
b. Cropping index

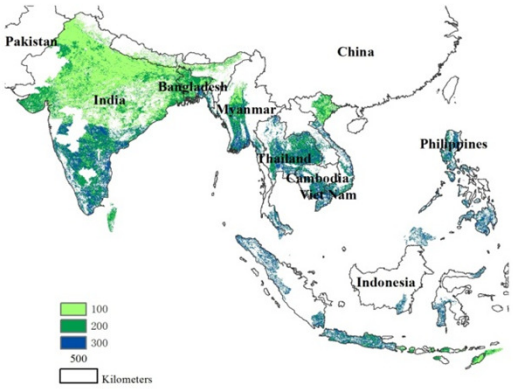




a. Cropped and uncropped arable land

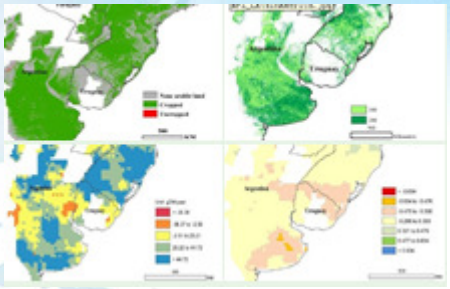
b. Cropping index

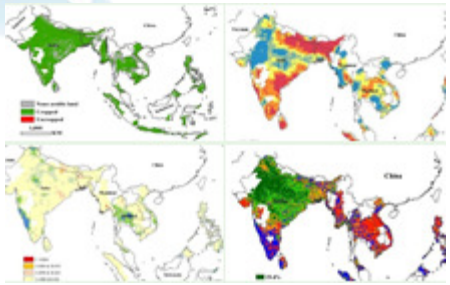


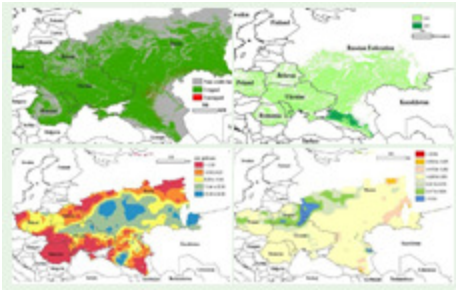


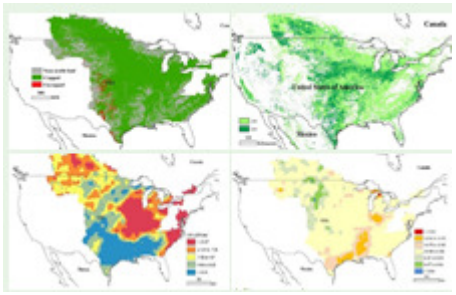
. Cropped and uncropped arable land

b. Cropping index





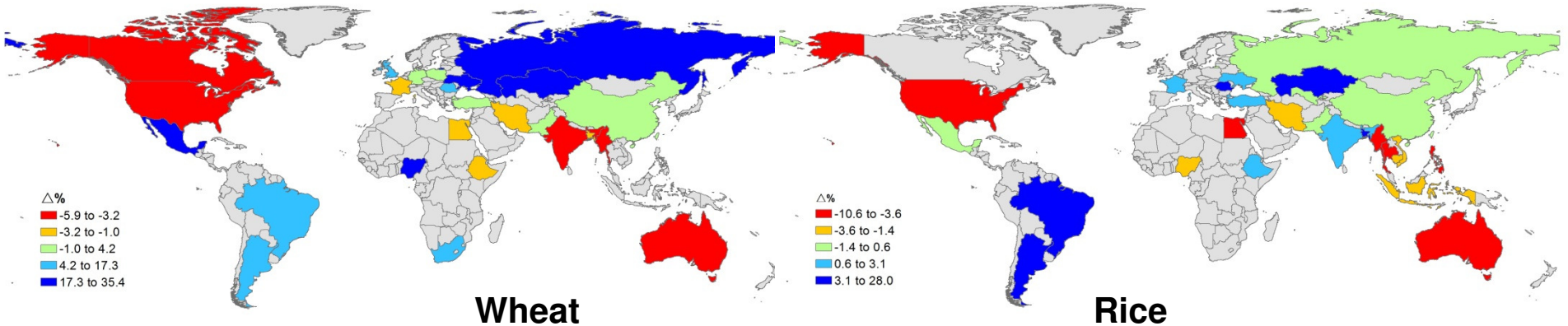




Cropping Intensity				Uncropped arable land			Potential biomass ratio		
	2013	Δ%	Trend	2013(%)	Δ%	Trend	2013	Δ%	Trend
AFRICA									
Egypt	134	-2.5	-0.560*	21.37	-3	-0.807**	0.872	1.889	0.643**
Ethiopia	140	-4.2	-0.226	0.42	-65	0.036	0.881	0.138	-0.761**
Nigeria	133	4.5	0.758**	1.61	-45	0.067	0.867	-0.159	-0.586 *
S-Africa	123	2.3	-0.156	6.18	+359	-0.290	0.812	-7.393	0.377
WEST ASIA									
Iran	140	-3.6	-0.195	16.44	-46	0.090	0.738	7.266	-0.014
Turkey	159	5.3	-0.425	0.85	-89	-0.332	0.881	7.116	0.664**
Central Asia									
Kazakhstan	100	-3.4	0.253	3.01	-78	0.470	0.834	13.825	-0.527*
Uzbekistan	111	-10.2	-0.291	3.16	-80	0.300	0.804	0.742	-0.341
EAST ASIA									
China	169	-3.0	0.773**	1.07	-29	-0.593*	0.902	0.117	0.796 **
S. Asia									
Bangladesh	180	0.8	0.250	1.27	+16	0.542*	0.858	-3.407	0.116
India	165	1.9	-0.011	0.74	-48	-0.712**	0.854	-0.893	0.771**
Pakistan	153	0.9	0.072	12.45	-23	-0.786**	0.798	4.476	0.688**
SOUTHEAST ASIA									
Cambodia	256	-3.3	-0.007	0.17	-46	-0.657**	0.805	-6.929	-0.042
Indonesia	296	0.9	0.219	0.08	+30	0.320	0.918	-0.858	0.026
Myanmar	204	-4.2	-0.010	0.98	+47	0.258	0.848	-5.450	-0.410
Philippines	293	0.1	0.531*	0.04	+40	-0.633*	0.910	-1.518	0.398
Thailand	260	-0.7	0.066	0.03	-41	-0.602*	0.862	-3.662	0.308
Vietnam	230	-4.8	0.442*	0.29	-16	-0.488*	0.891	-2.421	0.324
EUROPE-RUSSIA									
France	101	-2.1	0.090	0.12	-55	0.244	0.905	-0.646	-0.149
Germany	101	-4.4	0.284	0.03	+15	-0.204	0.916	0.100	-0.209
Poland	100	-4.8	0.260	0.01	0	-0.092	0.926	1.053	0.045
Romania	100	-1.7	0.084	0.04	-37	-0.205	0.899	0.067	-0.066
United Kingdom	100	-3.3	0.016	0.03	+31	0.257	0.882	-4.195	-0.206
Ukraine	101	-2.5	0.438	0.20	-23	0.332	0.885	-0.538	-0.084
Russia	106	-0.7	0.161	0.69	-44	0.649**	0.884	1.088	-0.677 **
NORTH AMERICA									
Canada	127	-0.9	-0.366	0.18	-76	-0.426	0.942	3.979	0.629 *
Mexico	130	-1.2	-0.388	3.49	-2	0.225	0.849	-1.485	-0.282
United States	135	-1.4	-0.011	3.54	-1	0.117	0.889	-0.023	-0.250

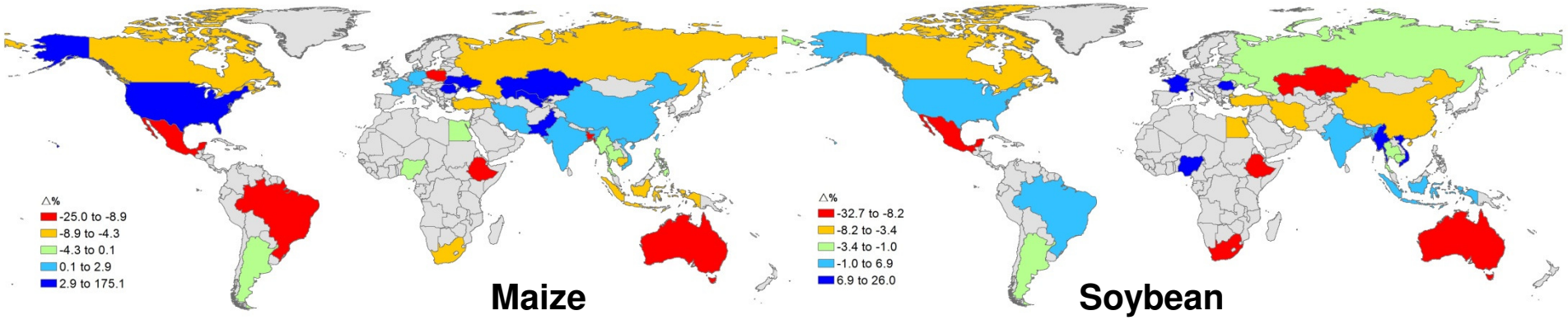
Crop Production

2013-2012 △%
（difference percentage ）



Wheat

Rice

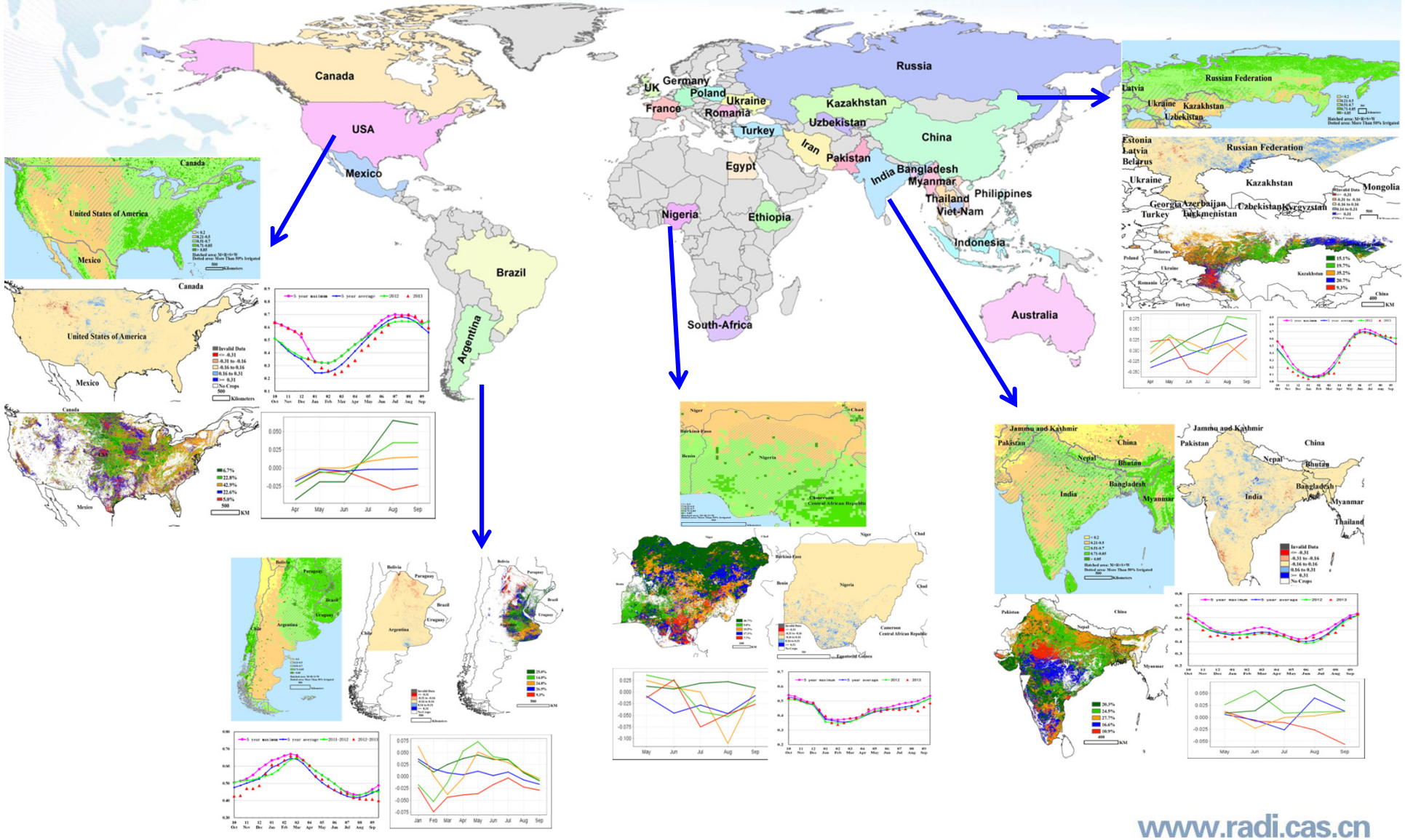


Maize

Soybean

Crop Condition

30 Key Countries



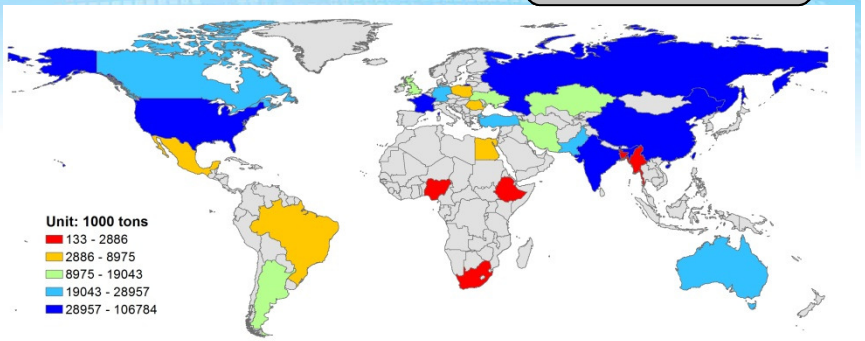
Crop Production

2013

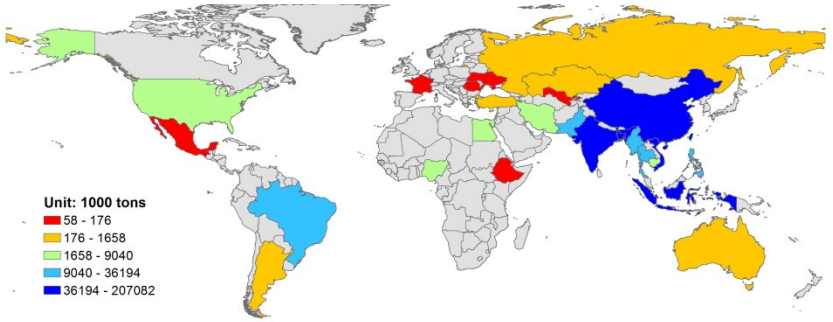
World

	Maize		Rice (paddy)		Soybean		Wheat	
	2013	Δ%	2013	Δ%	2013	Δ%	2013	Δ%
AFRICA								
Egypt	6938	-0.9	6088	-6.3	31	-3.5	8602	-2.2
Ethiopia	5528	-9.0	90	1.0	26	-28.0	2886	-1.0
Nigeria	9295	-1.2	4700	-2.7	507	12.7	133	32.5
S-Africa	11430	-8.6			780	-8.2	1899	5.9
WEST ASIA								
Iran	1259	2.9	2350	-2.1	185	-7.5	13650	-1.1
Turkey	4400	-4.3	890	1.1	109	-5.5	20950	4.2
Central Asia								
Kazakhstan	295	175.1	284	28.0	152	-10.9	18019	35.4
Uzbekistan	232	11.6	120	0.1				
EAST ASIA								
China	205632	2.3	207082	0.7	13321	-3.5	106784	-0.2
SOUTH ASIA								
Bangladesh	1529	-25.0	42414	24.0	64	3.1	1001	-2.8
India	21410	1.7	155250	1.7	11857	3.1	90877	-4.2
Pakistan	3903	10.4	9297	-1.1			24365	3.6
SE ASIA								
Cambodia	754	-4.6	9040	-2.8	117	-2.3		
Indonesia	18503	-4.5	67393	-2.4	848	-0.5		
Myanmar	1492	-0.5	31005	-6.1	221	7.8	179	-3.6
Philippines	7189	-2.9	17358	-3.7				
Thailand	4815	0.04	36194	-4.3	178	-1.1		
Vietnam	4819	0.3	43030	-1.5	221	26.0		
EUROPE-RUSSIA								
France	15764	1.0	126	2.1	113	8.7	39161	-2.8
Germany	5088	1.9			2	0.0	22616	0.8
Poland	2731	-19.8					8975	4.3
Romania	8835	48.4	58	14.1	123	18.4	6215	17.3
United Kingdom							14259	7.5
Ukraine	21900	4.5	165	3.2	2337	-3.0	19043	20.8
Russia	7588	-7.6	1054	0.2	1781	-1.4	46980	24.5
N. AMERICA								
Canada	11196	-4.3			4558	-6.4	26137	-3.2
Mexico	19852	-10.1	176	-1.2	226	-8.5	2943	30.3
United States	293890	7.3	8719	-3.6	83123	1.3	58084	-5.9

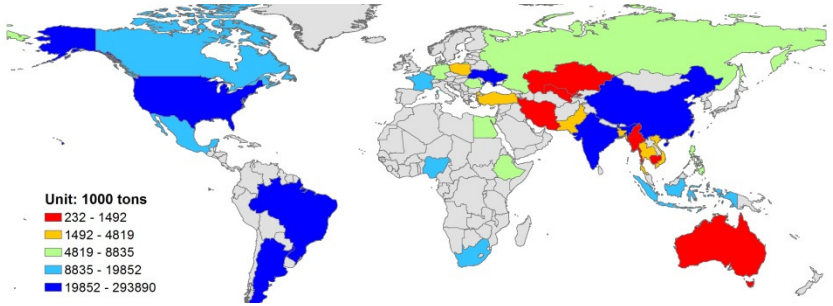
Wheat



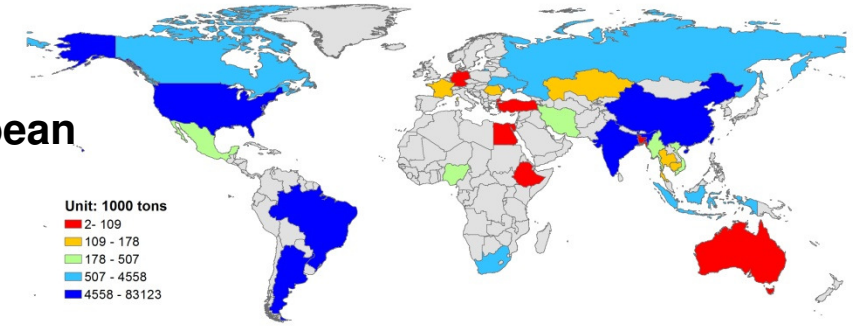
Rice



Maize



Soybean



Crop Production in China

China	Maize		Rice (paddy)		Soybean		Wheat	
	2013	Δ%	2013	Δ%	2013	Δ%	2013	Δ%
Anhui	3696	-1.3	15776	1.23	1021	-3.6	8115	-1.7
Chongqing	2613	1.2	4046	3.54			1021	1.7
Fujian			3312	-1.69				
Gansu	4331	2.6					3201	-0.9
Guangdong			12798	1.52				
Guangxi			12174	1.34				
Guizhou	3396	-0.1	4254	-0.26				
Hebei	16644	1.4			415	-3.3	10878	1.1
Heilongjiang	29627	5.5	18604	1.60	4443	-5.2	480	-37.2
Henan	17185	0.9	4107	1.81	994	-1.2	27510	0.1
Hubei			16206	0.19			2359	-2.9
Hunan			26378	-0.25				
Inner Mongolia	17961	5.2			1115	-2.4	1185	7.5
Jiangsu	2317	-0.03	16958	-0.39	646	1.0	8499	-1.6
Jiangxi			18405	-0.51				
Jilin	23360	1.9	4445	1.33	525	-4.0		
Liaoning	13823	2.2	5063	0.81	389	-3.7		
Ningxia	1302	4.0	648	-2.27			741	-6.5
Shaanxi	5802	3.8	764	1.02			1971	-1.1
Shandong	19954	0.03			762	-2.2	22075	1.3
Shanxi	8737	0.4			262	-0.6	1976	-2.1
Sichuan	6991	1.3	16566	2.39			4930	1.3
Yunnan	6074	2.0	5090	-1.60				
Zhejiang			6666	0.59				
Sub-total	183813		192261		10572		94941	
Remaining 12 provinces	21817		14821		2749		11843	
National Total	**205632**	**2.3**	**207082**	**0.7**	**13321**	**-3.5**	**106784**	**-0.2**

2001 Decision support

Background:
During year 2000 and 2001, a sever drought prevailed in most area of China.

Other department

Many department and organizations came to the conclusion that the crop yield will suffer a great loss, and some estimate a 10-15% production decrease.

CropWatch

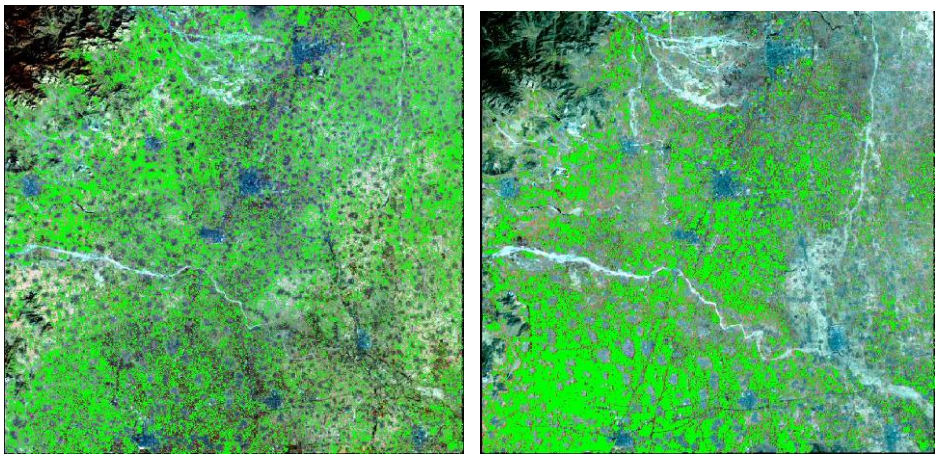
Based on our own analysis, CropWatch concluded that crop yield in 2001 would be similar as year 2000, and only 3% production decrease was estimated.

Our conclusion was considered and reported to the Vice president Wen Jiabao, which provided strong support for the national food control and gained highly praise.

2001 **2004**

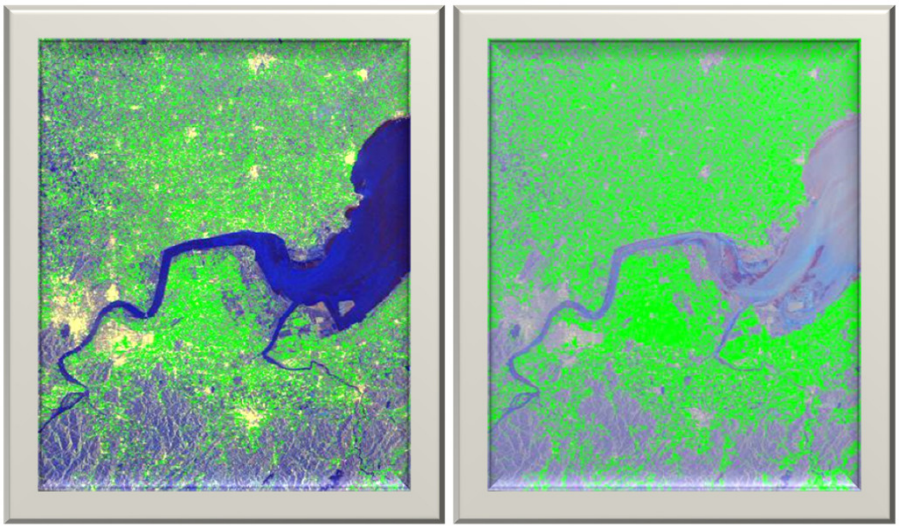
Policy performance

- **Planting area of summer crop decreased 4.1% and the production decreased 1.26%**
- **The early rice area increased 21.7% and the production increased 20.8%**



2003 2004

Bao Ding, Hebei province

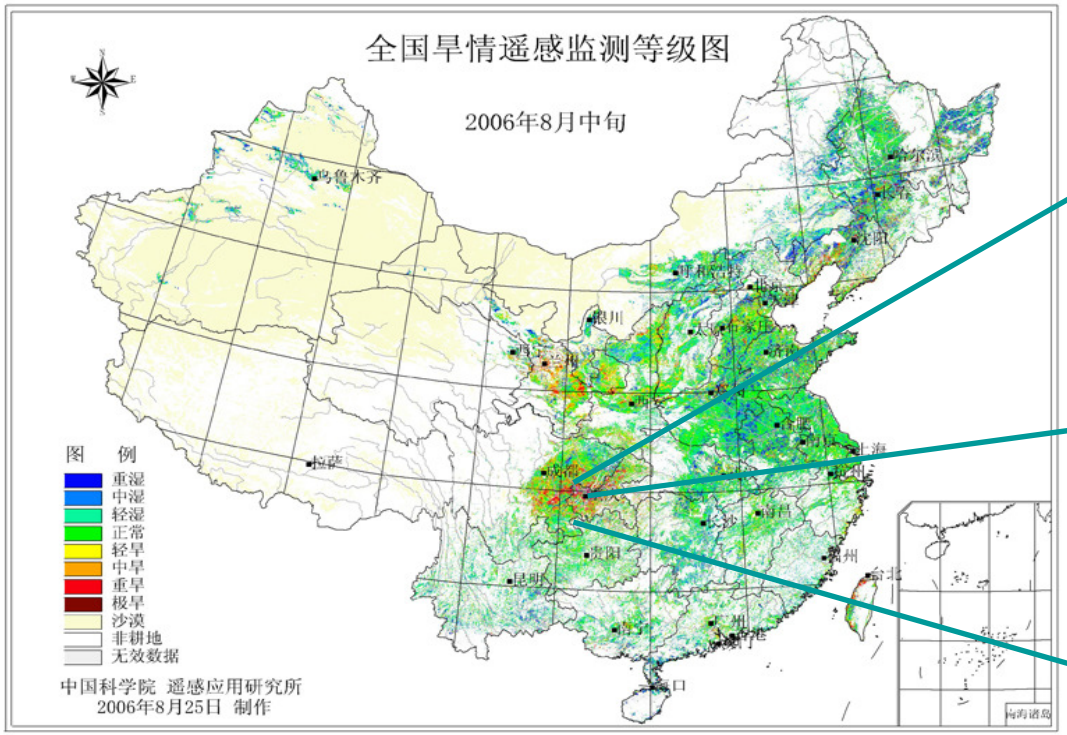


2003 2004

Zhejiang province

2001 2004 **2006**

Accurate monitoring of the severe drought in Sichuan and Chongqing province in China

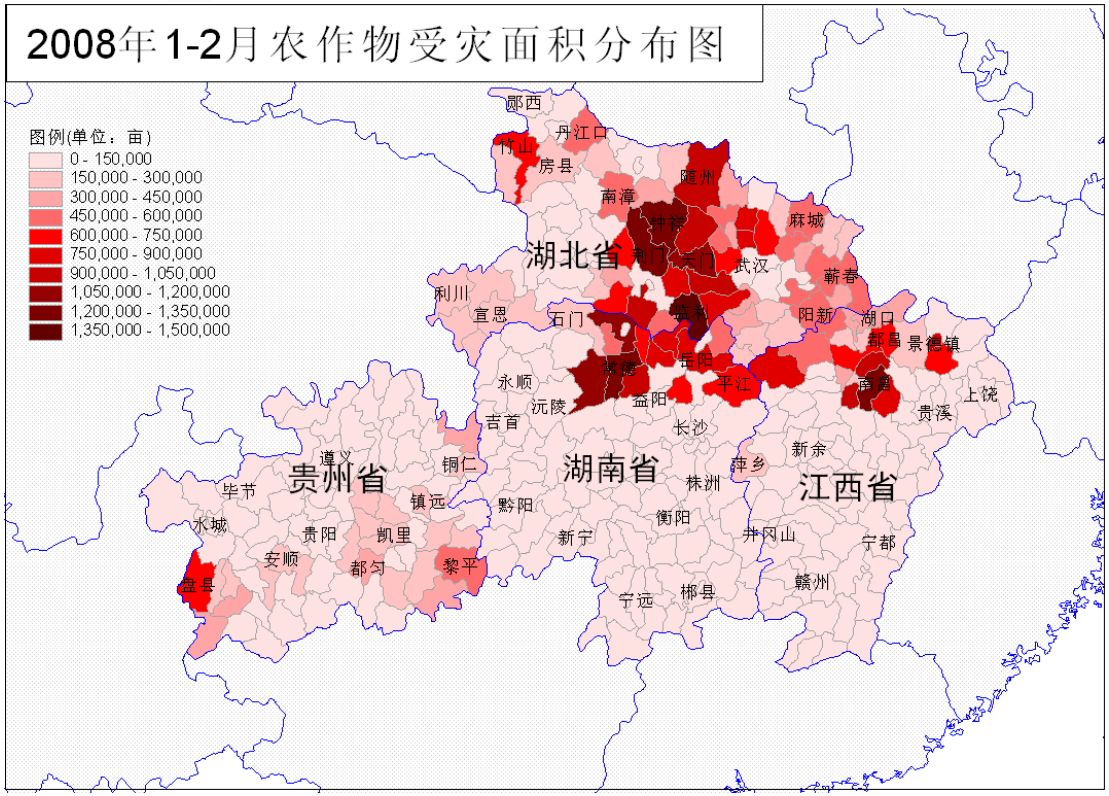


- 60-70% farmland in Chongqing and 40-50% farmland in Sichuan were affected by drought
- The autumn production had 1% decrease due to this drought in August

RADI www.radi.cas.cn

2001 2004 2006 **2008**

Snow damaged area estimation in south China



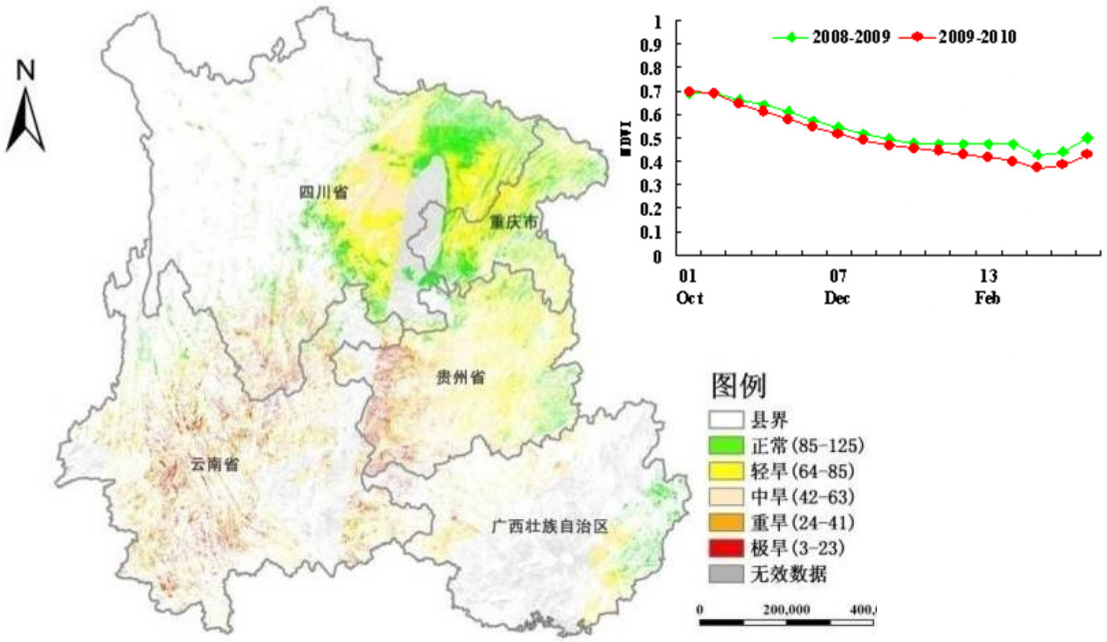
Total damaged area 4,297kHa.

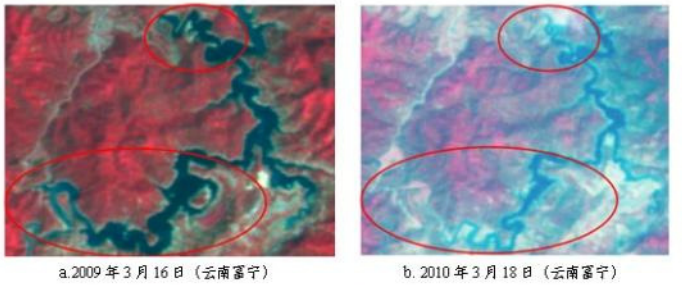
Province	Damaged area （kHa.）
Jiangxi	895
Hubei	1882
Hunan	957
Guizhou	563

RADI www.radi.cas.cn

2001 2004 2006 2008 **2010**

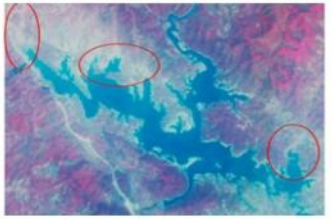
Yield loss estimation due to the severe sprint drought in Southwest China

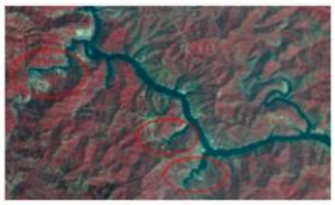



a. 2009 年 3 月 16 日（云南富宁）

b. 2010 年 3 月 18 日（云南富宁）


c. 2009 年 3 月 16 日（广西百色）


d. 2010 年 3 月 18 日（广西百色）


e. 2009 年 3 月 16 日（贵州册亨县）

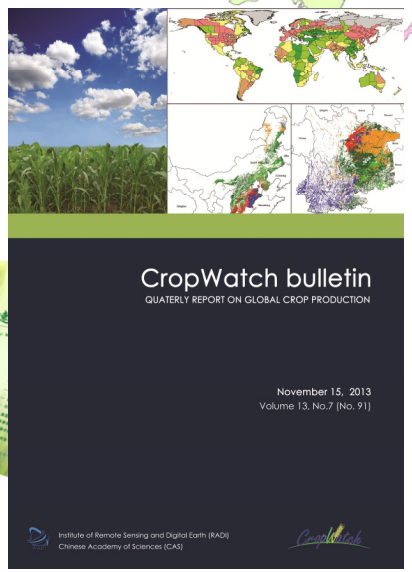

f. 2010 年 3 月 18 日（贵州册亨县）

	Chongqing	Sichuan	Guizhou	Yunnan	Total
Reduction in WW prod. (10kT)	5.9	24.9	12.9	39.3	83.0
Percentage of total prod. (%)	5.7	5.6	30.7	48.0	13.7

Total loss of winter wheat (WW) production reached 8.3×10^5 t, taking account 13.7% of four provinces production and 0.8% of the whole country's production

2001 2004 2006 2008 2010 **2013**

Wheat	Maize	Rice	Soybean
China	United States	China	United States
India	China	India	Brazil
Russia	Brazil	Indonesia	Argentina
United States	Argentina	Bangladesh	China
France	Ukraine	Vietnam	
Australia	India	Thailand	
Canada	Mexico	Myanmar	
Pakistan	Indonesia	Philippines	
Germany	France	Brazil	
Kazakhstan	Romania	Cambodia	
Ukraine	Canada	Pakistan	
Turkey	South Africa	United States	
Argentina	Nigeria		
United Kingdom	Ethiopia		
Iran			
Poland			
Egypt			
Uzbekistan			
Brazil			



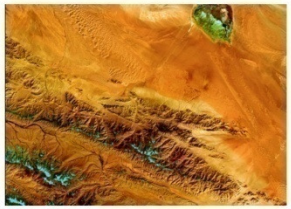
CropWatch Bulletin

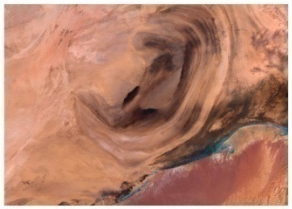
http://www.cropwatch.com.cn/en

CropWatch® Features

- Remote sensing data are main data used
- Independent without using statistic data
- Automatic processing, only 3 full time staff
- Validation and uncertainty analysis carried out since 2001.
- Quality control schemas had been introduced
- Continuous operation from 1998
- Crucial information services to the central government

Thanks!



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